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CENTRAL INTELLIGENCE AGENCY
INFORMATION REPORT

COUNTRY USSR

SUBJECT Abstract of Intercrystalline Corrosion of Alloys by
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1. Intercrystalline Corrosion of Alloys

By

G. V. Akimov

This kind of corrosion occurs on the boundaries of crystallites or grains, and penetrates into the depth of the metal, which then gradually loses its plasticity and strength, and frequently becomes brittle. The author saw the cover of an airplane which was in long service in the Arctic region. From the outside the cover looked well, but it would be easily punched by a finger. Parts of it disintegrated into small pieces at even the slightest effort.

The alloys as follows were frequently attacked by intercrystalline corrosion: duralumin ($AlCu_{43}MgMn$), magnalium ($AlMg_{13-17}$), some aluminum-copper alloys ($AlCu_{4-8}SiMn$), and stainless steels ($FeCr_{13-17}C$), ($FeCr_{27}C$), and ($FeCr_{18}Ni_{8}C$). As is well known, the susceptibility of the alloys to intercrystalline corrosion depended on the heat treatment given them. Some steels exhibited the same kind of corrosion in nitrate solutions. Intercrystalline corrosion was also observed on silver (Ag with admixtures of Pb, Cu, Zn), which was 2 to 3 thousand years old, and was found in ancient tombs.

The author explains intercrystalline corrosion using the concept of local elements. The grain boundaries are the anodic areas for two reasons: 1) limited access of oxygen, and 2) impurities which segregated on the boundaries during the cooling of the alloy or during the heat treatment. The cathodic areas are the center of the grains. Further

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Montenegro Workings
 Montenegro Sample Plan
 Sample Index, Montenegro
 East End of Montenegro Showing Tunnels No 3 and No 6
 Penasco Workings
 Outcrop, Penasco
 View of Penasco Outcrop
 La Ballena Workings
 La Ballena Tunnel No 3
 View of Santa Sofia
 Entrance to Tunnel No 4, Santa Sofia
 View of Sayre's Camp
 Scene on Trail Between San Jose Finca and Sayre's Camp

3. Appended to the report are the following documents:

- a. Geology Report of A H Means, Mining Geologist, 13 Nov 22
- b. Report on Guatemala Mining Venture; C H Echols, December 1949, to which is attached a monthly minimum budget, an exploration budget, cost and mill capacity, curves and conclusions arrived at by John M Tufts, Jr.
- c. Copy of Contract with Guatemalan Government - Compania Centro Americana de Minas, S. A. (in Spanish) and an English translation.
- d. A precis of the 1934 mining code of Guatemala, Decree No 2000 (in English)

- end -

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